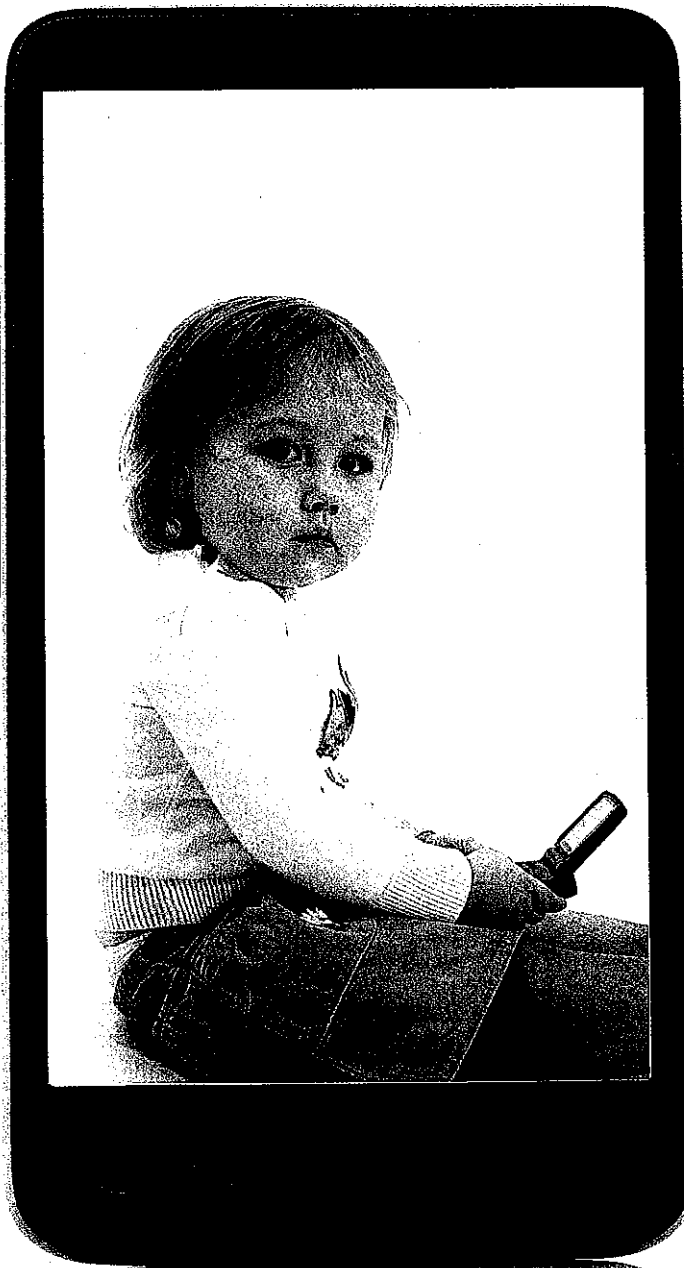


Education and the Role of the Educator in the Future



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The world is changing, and our mandate is to prepare students for their lives in the future.

**By Ian Jukes,
Ted McCain, and
Lee Crockett**

In a world experiencing exponential change, schools will need to prepare students for the dynamically new environment they will face upon graduation. By continuing to focus on the short term — preparing kids for the next unit, the next semester, or the next grade — we fail to recognize that our current system is becoming obsolete.

The key to successfully changing the system is to have a clear goal in mind. How do we determine what our goal should be, particularly in light of the rapidly changing modern world? To begin, we should never limit our focus by only looking at what's "hot" today. In times of exponential change, we can't base decisions on what exists in the present. The world is changing, and our mandate is to prepare students for their lives in the future.

We must look at education the same way a quarterback looks at the football field. We

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must perceive where things are headed so we can respond appropriately. We must accept that we have a paradigm for how we expect life to unfold; that in times of radical change, we all suffer from some degree of paradigm paralysis; and that change requires us to let go of ideas and ways of doing things that we hold dear. Keep this in mind as we outline the future goals for education. We envision a shift from text-

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books, brick-and-mortar classrooms, lectures, worksheets, standardized tests, bells — in fact, everything we grew up expecting of school — to learning whenever and wherever it can best happen.

A shift of this magnitude will force teachers to examine their role in student learning. Without a doubt, how educators do their daily tasks will change. We must identify the broader roles that will endure as the world continues to change dramatically. The essence of what educators must do in the future is the very same as it's always been: to help students learn the relevant skills, knowledge, attitudes, attributes, and behaviors that they'll need to be good and productive citizens, parents, and workers.

As we outline the goals of education in the 21st century, let's also consider some of the new functions and responsibilities of teachers.

CUSTOMIZE LEARNING FOR THE LEARNER

Young children learn intuitively. Learning in school, however, is quite a different matter. The problem is that the school system is designed for handling large numbers of young people rather than individual students. Our entire educational system is created around a 30:1 approach to instruction, which necessitates teaching to a group rather than teaching to individuals. Students are grouped by classes, grades, and geography. This has a real cost in terms of meeting the needs of all of the students in any of these groups. A typical group of 30 students has a wide range of abilities, interests, maturity, and learning styles, and for the sheer sanity of the teacher, he or she must teach to the middle in terms of student ability.

The major casualty in this approach is engagement for the individual student. This is a problem of immense proportions; any teacher will tell you that engagement is the key ingredient to real learning. By not addressing the individual abilities and inter-

ests of each student, we've created an educational system that works against the ultimate goal of fostering a love for learning in each student. In fact, the design of the current system goes against what we know about learning from brain research. John Medina has this to say in his book, *Brain Rules*:

Every student's brain . . . is wired differently. That's the Brain Rule. You can either accede to it or ignore it. The current system of education chooses the latter, to our detriment. It needs to be torn down and newly envisioned, in a Manhattan Project-size commitment to individualizing instruction. We might, among other things, dismantle altogether grade structures based on age. (Medina 2008: 69)

Technology will empower individual students to master course material at their own pace. With individualized instruction, the delivery of course content can be adjusted to the individual abilities of the student. When this occurs, the focus of schooling will shift away from achievement based on age and grade level to the mastery of content and skills.

LEARNING IS BOTH VIRTUAL AND PHYSICAL

Technology has already made virtual relationships part of our lives. As virtual worlds become more realistic, they'll blur the lines between real life and virtual reality. Virtual communication with people from around the world will approach the ease of real-world communications.

This will have profound implications for education. Teachers and students will no longer have to be in the same place for learning to occur. Furthermore, the quality of the virtual interaction between teacher and student will be sufficiently natural so that the communication won't suffer simply because they're not face to face. The advantages of this kind of interaction will make its use compelling in the near future.

Technology will also empower students to accomplish learning when and where it's convenient or practical for a particular student. The staggering growth in the capabilities of technology and wireless communication to handle all types of information have huge implications for where learning will take place. No longer will education be confined to school buildings. It will take place in parks, on buses, on boats, in museums, on football fields, at the ocean shore, and so on. Learning will take place almost anywhere the student has a teachable moment, which makes learning more relevant.

Students will still be able to meet, discuss, play basketball, and interact with others in smaller, community-based schools that are close to their homes; but the need for a large school building with all its resources will be greatly diminished due to access to virtual learning resources.

LEARNING IS NONLINEAR

New technologies will also keep track of individual progress through established educational milestones in a nonlinear fashion. This is impractical in the current education system where students are taught concepts in a unit-by-unit sequence, year after year.

Real learning often follows a nonlinear path that develops as cognitive links are formed. For example, a 6th-grade student may become interested in rockets and pursue the topic further, exploring ideas from the 8th- or 10th-grade science curriculum. The wonderful thing about this kind of learning is that, because interest drives the learning, it will be more complete and long lasting than if the student had been forced to consider 6th-grade science concepts before 7th- and 8th-grade science, each separated by a calendar year. This kind of learning spawns engagement because it allows students to follow spontaneous ideas and interests. David Thornburg captured the power of this kind of learning:

Technology allows learners to move through conceptual space at the speed of thought. (1993)

In the current system, it's impossible to keep track of an individual's progress when learning proceeds this way. However, exponential growth in the power of technology will soon produce intelligent technology that can easily keep track of the path these conceptual links follow for each individual student. How is this possible? Amazon.com, for instance, uses a technology called System for Managing Agents in Real Time (SMART Agents), which learns about a person's interests from their purchasing history and then makes suggestions for what he or she might be interested in next. Intelligent tracking software would guide students as they develop cognitive links. Intelligent tracking software will identify instructional holes and remind students of curricular goals that have not yet been met and suggest learning experiences that will cover the required course content.

The Educator's Role: Facilitator. The educator's role in nonlinear learning is to be a facilitator, or a guide, rather than a classroom manager. He or she must create an engaging methodology that compels students to want to learn. Educators must show students how to follow the trails to learning for themselves or how to blaze their own trails. They must en-

courage students to go in different directions from the traditional beaten paths learners have always followed.

LEARNING WITH THINKING MACHINES

Up until now, technological tools have been used for searching, retrieving, viewing, organizing, calculating, and editing information. Although these powerful tools assist with many tasks that would normally be beyond human capabilities, their use has been guided by direct human involvement. High-level thinking and the decision-making process have remained exclusively human tasks.

A new era of intelligent machines has finally begun. In his book, *The Extreme Future*, James Canton makes the following statement regarding the growing power of machines:

With decreased costs of computer chips and vast, exponential increases in processing power, all products in the future will have the capacity to "think." Products will be connected and sense, talk, interact, and make decisions with humans and for humans. (2006: 256)

In the future, students will interact with SMART tutors that will assist them with skill development in mathematics and reading. Web sites will run intelli-

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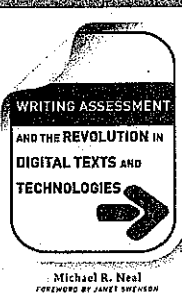
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Until now, the demands of teaching lower-level skills eat up so much time and effort that it's very difficult for teachers to make room for teaching higher-level process skills. Thinking machines can offer teachers some real hope for changing this. Some teachers, especially those who have been teaching for a long time, may find the next few years challenging, but the benefits are well worth it. The appropriate use of technological tools will allow teachers to focus their time on teaching higher-level skills.

LEARNING IS FOCUSED ON MULTIMEDIA

In his book, *Mind Set!*, John Naisbitt makes a very simple statement that has huge significance for educators:

A visual culture is taking over the world. (2006: 113)

His statement is startling. While there are substantial reasons for continuing to teach students to read, write, and process words, our connection with the daily reality of the modern world is tenuous because we have not embraced the growing visual culture that students, parents, consumers, and businesspeople experience through print and electronic media. Audiovisual communication through a variety of media has become the norm. Equipping students with the skills to process multimedia messages will very soon become imperative.

Education will focus on two sets of multimedia information processing skills. The first set of skills will be concerned with how a student receives and decodes messages sent in a wide range of media. Can the student see the real message being communicated? Is there bias in the information being presented? The second set of skills involves the communication of messages by the student using various multimedia formats. Students are not only consumers of information in the modern world, they're also producers and publishers of information. Students will need to learn how various media can be manipulated to better communicate what they want to say.

The Educator's Role: User and Advocate of Technology. Teachers must become advocates for getting current technology into their classrooms so that all students can benefit. Instead of banning digital devices,

1:1 computing should be encouraged. This isn't about being "progressive." It's about having a digital network culture where using digital tools is the new reality of both business and personal life. A young person simply can't leave school without relevant technology skills and expect to succeed in modern life.

LEARNING IS COLLABORATIVE

Collaboration is essential for individuals, workers, and companies. Individuals collaborate in networked games to accomplish tasks, students from different parts of the world are beginning to cooperate on projects for school, workers routinely cooperate with coworkers using a variety of online tools, and even businesses that compete with one another are discovering that working together is the best strategy for success.

Students must acquire collaboration skills if they're to succeed in life and the modern workplace. Students will have to become at ease working with virtual partners and functioning in workgroups separated by time and distance. Collaboration will also become an essential element of instruction. New online tools and SMART tutors will allow experts in various fields to virtually enter the school environment to meet with students and assist teachers with course content. The responsibility for instruction will become shared between educators and the community.

The Educator's Role: Lifelong Learner. Educators are beginning to understand that they must transition from teaching students to learning with students and even to learning from students. Transforming our professional practices to include continual learning is a powerful teaching strategy that enables educators to maintain relevance by becoming excellent role models, learning guides, process instructors, and futurists.

As educators in the new millennium, we must see ourselves as members of a learning organization that develops, adapts, and transforms itself in response to the needs and aspirations of people it connects with. Learning makes the organization stronger and keeps it relevant. One can't be static in such an organization. For many teachers, this will mean realizing there is a big difference between teaching for 15 years and teaching one year 15 times.

LEARNING IS WHOLE MIND

Brain research has also discovered that the high-level thought required to solve complex problems always involves both sides of the brain working in concert. Traditionally, school has focused on activities that exercise the left side of the brain — reading, writing, arithmetic, and logical analysis. This ap-

proach served people well in the late Industrial Age of the 20th century; however, the emergence of the Information Age has changed the kinds of skills that people need for success in the world.

This new age of automation and outsourcing requires higher-level thinking skills. Being able to process information to see patterns, make connections, determine meaning, and see the big picture are right-brain tasks. While students must develop left-brain skills in reading, writing, arithmetic, and logical analysis, they must also develop right-brain skills in information processing and problem solving. Daniel Pink captured the significance of this shift in his book, *A Whole New Mind*:

In a world tossed by Abundance, Asia, and Automation, in which left-brain-directed thinking remains necessary but no longer sufficient. . . . We must perform work that overseas knowledge workers can't do cheaper, that computers can't do faster, and that satisfies the aesthetic, emotional, and spiritual demands of a prosperous time. (2006, p. 61)

LEARNING IS BASED ON DISCOVERY

Teachers talk, students listen — repeatedly, day in and day out. Students cram for tests and try to temporarily memorize as much of the content as they can to get a good grade. This is the essential paradigm of 20th-century education. Unfortunately, the grim reality is that most students have forgotten the content they memorized within 48 hours after the test. Worse yet, students don't develop skills that will be useful to them outside the walls of school. Most teachers would prefer to delve deeper into the ma-

terial in their courses, but the limits of time to fulfill all standard requirements prevent them from exploring alternative methods of instruction.

Let's consider that young people already participate in discovery learning. They just don't do it in school. It happens as they search the Internet for information on topics that interest them. They're getting online guitar lessons, searching Google for ad-

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vice on how to fix a mountain bike, learning how to alter images in Photoshop through YouTube, and investigating what to do about acne from WebMD. They're discovering all kinds of things about the world around them — just not the kinds of things they encounter at school.

Thanks to the exponential growth in technological power, learning will shift from secondhand experiences through lectures and books to firsthand discovery experiences. Online environments with SMART Agents will share multimedia information with students in natural interactions involving voice, facial expression, and body language. Simulations will empower students to discover how the world around them works through amazingly realistic virtual experiences of the microscopic, outer space, and everything in between. History will come alive with re-creations of important events, battles, speeches,

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I made the decision to do all teacher appraisals and walk-throughs, (110+), myself this past year. Thanks to the training I received from TBC, I was able to spend many hours in classrooms and in productive coaching conversations with staff members every week. Our school, overwhelmingly populated by economically disadvantaged students, received state recognition for programs implemented as a direct result of my coaching from the classroom level, rather than from behind my desk.

– Lisa Kersh, Principal, Plainview High School, Plainview, TX

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and so on. Students will have access to information sources that will allow them to experience current events firsthand. The focus of teachers will shift to creating learning tasks that challenge students to develop higher-level thinking skills through discovery.

LEARNING IS PROBLEM-BASED

The traditional approach to instruction focuses on content delivery. A great challenge teachers face is how to deliver the content in a course curriculum while creating engagement in the learning activities and providing relevance — which is essential for long-term learning to occur. Teachers will have to use right-brain thinking activities as vehicles for instruction. For example, a science class could use paintings to illustrate concepts in chemistry. These kinds of tasks not only address course content, but they also help students develop the whole-mind thinking skills they will need for future success.

The Educator's Role: Crafter of Problems. Teachers need to take academic material and craft problems that will lead students into the required content while developing high-level thinking skills to solve the problem. Such problem-based tasks must also be appropriate for the intellectual and social development of students. To ensure that the task produces the engagement and relevance necessary for effective learning, the problem should have a link to the world outside school. Constructing these tasks requires a bit of skill and involves a number of factors. Training in problem-based instruction needs to be a priority for teachers, especially those who have been using a content-driven approach for a long time.

EVALUATION IS HOLISTIC

Assessment is about getting a picture of a student's learning. The main evaluative tool used by the school system for measuring performance is the written test: multiple-choice questions, essays, and written reports. These tools provide a snapshot of what a student knows about specific details on a certain topic. The question is, do these tools give a complete and accurate picture of student learning? The answer is no; written tests predominantly reflect only memory and the regurgitation of content.

To understand the limited scope of written tests, let's think about how the motor vehicle department decides whether a person has learned enough to be allowed to drive a car on public roads. A multiple-choice test assesses whether student drivers have learned the rules of the road and some basic concepts of speed and braking. Upon passing the test, a student is granted a learner's permit to practice driving a car. The final evaluation is done by an examiner who rides along with the student driver to gauge the level of driving skill as the student performs various

driving tasks. Although the aptitude test is one part of the evaluation, it can't measure the true level of a student's actual driving skills.

Clearly, written tests play only a small part in evaluation. They can't measure all of the skills developed in drawing pictures, playing an instrument, refuting an argument in a debate, playing basketball, and a whole host of other activities.

Because of the increasingly disposable nature of information, the importance of memorizing specific content will decrease. Instead, students must learn to apply processes for writing, researching, and problem solving in order to accomplish tasks. To succeed in the modern world, students must be able to:

- Determine the relative importance of various pieces of information that may be contradictory or incomplete, then make personal evaluations of that information to develop informed opinions;
- Articulate informed opinions through writing, presentations, debates, and various multimedia communications;
- Use imagination to produce creative expressions of ideas and feelings through story, poetry, music, visual art, and performing art; and
- Combine technical skill and creativity to cook a meal, build a desk, perform an experiment, and so on.

These are just a few examples of the skills students will need. Real learning encompasses social skill development and the consideration of others. We must embrace other forms of evaluation or develop new ones if we hope to get a complete picture of student learning.

The Educator's Role: Holistic Evaluator. It is vital that teachers become holistic evaluators. All facets of learning must be esteemed in assessment. We should consider portfolios of student work, live performances, and other demonstrations of creativity and competency when we're choosing assessment tools. Educators will provide feedback so students can improve their performance. Students need timely, targeted, nonjudgmental feedback and opportunities to make mistakes as they learn and not be penalized for them. They also need authentic audiences in a variety of settings and contexts in which to demonstrate what they can do. Most of all, students need the encouragement to try things with all kinds of tools, technologies, and techniques to create various products that reflect their understanding of concepts.

As sophisticated software takes over summative assessments, teachers will have time to use evalua-

tive tools that are currently underused or not used at all. This will be an essential shift because many of the skills and attributes of people who will be successful in the future aren't easily measured by written tests.

NEW MODELS FOR TEACHER TRAINING

It will take more than a few professional days devoted to technology use or problem-based learning to prepare teachers for their new roles. Teachers must make a fundamental shift in their paradigm for teaching and learning. We must recognize that the current education system has been set up to prepare students perfectly for a world that no longer exists. Massive, ongoing retraining for educators is essential if schools are to be made relevant to the modern needs of all students.

Despite the perception of much of the public and the media, teaching is a difficult, challenging, stressful job. Teachers are asked to do a great number of things beyond teaching. The kinds of changes we're suggesting here will never happen within the current model of professional development for teachers.

Many companies have recognized that to be truly effective in reeducating their workforce, they have to remove their workers from their regular work for

extended periods of time so they can focus on the task of learning. Many companies have built training centers and have a significant portion of their workers attending retraining classes on an ongoing basis.

Schools will have to do the same. Retraining will require regular classes for teachers for which they are released from their regular teaching duties. If we want to see the kinds of changes necessary to bring schools in line with the new reality, then we have no option but to radically reprioritize and restructure professional development for teachers. **K**

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